



**Central
Arizona
College**

2019 Pinal County High School Math Competition

Level I

Simplify the following expression

$$\frac{10^6 - 10^4}{99}$$

a.) 10^2

d.) $\frac{20}{99}$

b.) 10^4

e.) None of the above.

c.) $\frac{100}{99}$

If the greatest common divisor of two natural numbers a and b is 3 and $\frac{a}{b} = 0.4$, what is ab ?

a.) 12

b.) 90

c.) 36

d.) 30

e.) None of the above.

A 60% alcohol solution is to be mixed with a 42% alcohol solution. How many liters of the 60% solution should be used to make 30 liters of a 54% alcohol solution?

a.) 15

d.) 10

b.) 18

e.) None of the above.

c.) 20

Solve for x.

$$4ax - 3 = 15 - 2ax$$

a.) $x = 3a$

d.) $x = \frac{4}{a}$

b.) $x = 4a$

e.) None of the above.

c.) $x = \frac{3}{a}$

Factor completely

$$x^8 - 1$$

a.) $(x - 1)^8$

b.) $(x^4 - 1)(x^4 + 1)$

c.) $(x^2 + 1)(x^2 + 1)(x^4 + 1)$

d.) $(x - 1)(x + 1)(x^2 + 1)(x^4 + 1)$

e.) None of the above.

Question 5

The average of 10 numbers is 8. The average of another 6 numbers is 16. What is the average of all 16 numbers?

a.) 11

d.) 16

b.) 12

e.) None of the above.

c.) 15

Determine the greatest prime factor of 2019.

a.) 1

b.) 219

c.) 673

d.) 2019

e.) None of the above.

Solve the following equation for P.

$$A = P + Prt$$

a.) $P = A - Prt$

d.) $P = A - rt$

b.) $P = \frac{A}{1+rt}$

e.) None of the above.

c.) $P = \frac{A}{2rt}$

The graphs of $2x + 3y = 7$ and $ax + 2y = 5$ intersect at right angles. Find the value for a .

a.) $a = -3$

d.) $a = \frac{3}{2}$

b.) $a = 3$

e.) None of the above.

c.) $a = -\frac{2}{3}$

The length of a rectangle is 6 meters less than twice its width. If the area is 108 square meters, find the dimensions of the rectangle.

a.) Length = 36 m, Width = 3 m

d.) Length = 12 m, Width = 9 m

b.) Length = 9 m, Width = 12 m

e.) None of the above.

c.) Length = 6 m, Width = 6 m

The public swimming pool, which is a rectangle measuring 27 meters by 25 meters, needs a new deck. The deck of uniform width that will surround the pool will be made of concrete. There is only enough money in the budget to cover 768 square meters with concrete, how wide should the path be?

a.) 4 m

d.) 8 m

b.) 6 m

e.) None of the above.

c.) 10 m

The distance an object falls when dropped from a tower varies directly as the square of the time it falls. If the object falls 144 feet in 3 seconds, how far will it fall in 15 seconds?

a.) 240 feet

d.) 4050 feet

b.) 3600 feet

e.) None of the above.

c.) 3150 feet

If $x + \frac{1}{x} = 5$, what is $x^2 + \frac{1}{x^2}$ equal to?

a.) 26

b.) 25

c.) 24

d.) 23

e.) None of the above.

For what values of b , does the equation $\frac{4x-b}{x-5} = 3$ have no solution?

a.) 3

d.) 18

b.) 4

e.) None of the above.

c.) 5

Two cars leave Springfield, Illinois at the same time. One travels north at 60 miles per hour and the other travels west at 80 miles per hour. How far apart are they after 2 hours? (Hint: Use $d = rt$ to find the distance traveled by each car.)

a.) 100 miles

d.) 200 miles

b.) 280 miles

e.) None of the above.

c.) 188 miles

A contractor is considering a sale that promises a profit of \$30,000 with a probability of 0.7 or a loss (due to bad weather, strikes, and such) of \$10,000 with a probability of 0.3. What is the expected profit?

a.) \$20,000

d.) \$18,000

b.) \$24,000

e.) None of the above.

c.) \$30,000

A survey revealed that 36% of people are entertained by reading books, 32% are entertained by watching TV, and 13% are entertained by both books and TV. If a person is chosen at random, what is the probability that a person will be entertained by either books or TV? Express the answer as a percentage.

a.) 13%

b.) 55%

c.) 81%

d.) 68%

e.) None of the above.

How far from a 30 ft lamp post should a 6 ft man stand in order to cast a 10 ft shadow?

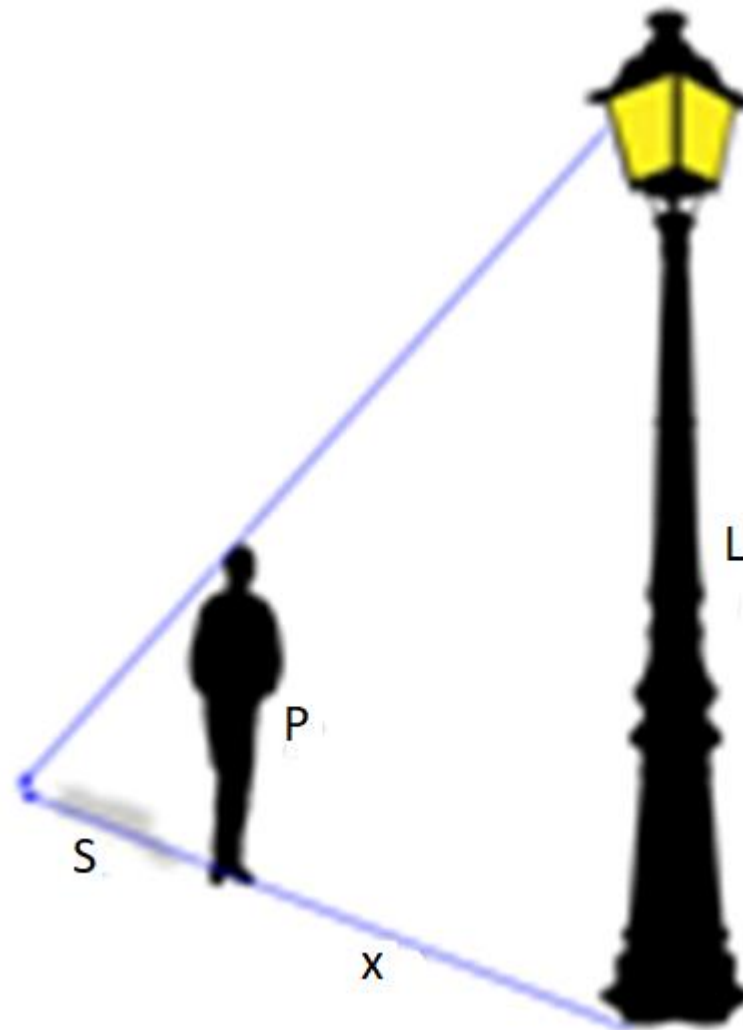
a.) 50 ft

b.) 40 ft

c.) 30 ft

d.) 20 ft

e.) None of the above.



Question 18

To solve for the lengths of the sides of the right triangle, which equation is correct?

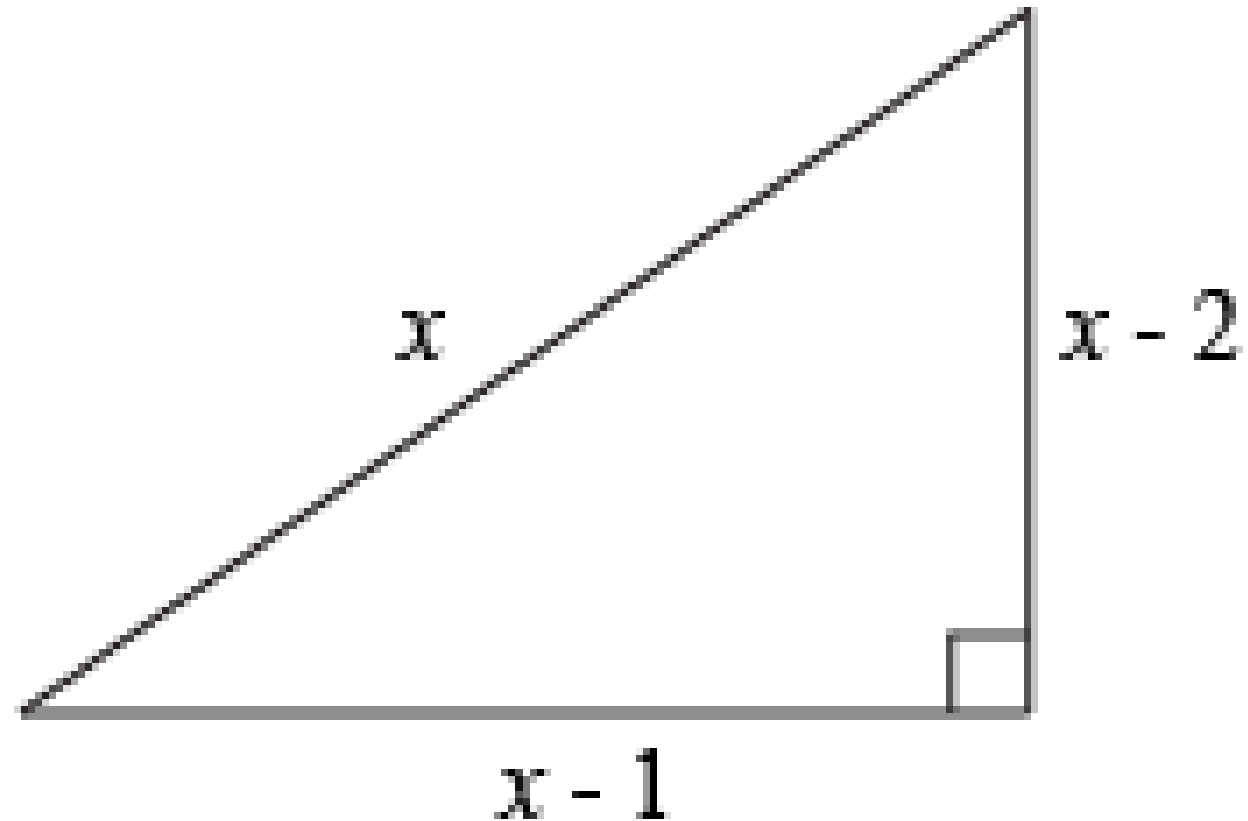
a.) $x = (x - 1) + (x - 2)$

b.) $x^2 = x^2 + 1 + x^2 + 4$

c.) $(x - 2)^2 = x^2 + (x - 1)^2$

d.) $x^2 = 2x^2 - 6x + 5$

e.) None of the above.



Evaluate the following expression

$$\left(\frac{64}{27}\right)^{-\frac{2}{3}}$$

a.) $\frac{9}{16}$

d.) $-\frac{16}{9}$

b.) $-\frac{9}{16}$

e.) None of the above.

c.) $\frac{16}{9}$